RUTHERFORD LIBRARY 2 - STAGE 1

DESIGN DEVELOPMENT PHASE: 2

MINSOS VAITKUNAS JAMIESON

ARCHITECTS

INTRODUCTION

As the Prime Consultant, I take pleasure in submitting Design Development Phase: II, of the proposed Rutherford Library 2 - Stage 1 Building for consideration by the University of Alberta.

This detailed design proposal further illustrates and defines the design concept approved previously by the University.

The submission consists of five parts: 1. Architectural - Design Development; 2. Structural - Design Development; 3. Mechanical - Design Development; 4. Electrical - Design Development; 5. Costing - Tabulation of Probable Cost.

In addition to the five parts, pertinent information prepared by the University is also included as part of this presentation.

The following firms have been retained as consultants for the project, and have contributed in the preparation of this submission:

Structural Engineers:	Whittaker, Laviolette, Leckie & Co. Ltd.
Mechanical Engineers:	Vinto Engineering Ltd.
Electrical Engineers:	Jarvis Engineering Ltd.
Acoustical Engineers:	Barron & Strachan

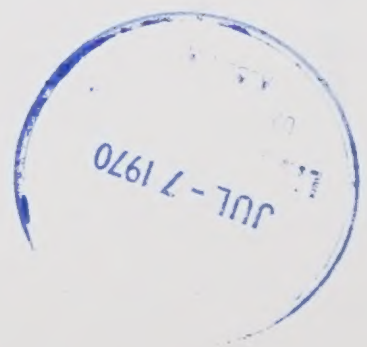
Yours very truly,

MINSOS VAITKUNAS JAMIESON ARCHITECTS

J. R. Vaitkunas
Prime Consultant

Rutherford Library #2 - Stage 1

June 1970



INTER-DEPARTMENTAL CORRESPONDENCE

TO Dr. W.D. Neal, Vice-President
Planning and Development

DATE July 2, 1970

FROM Mr. W.A. Hiller, Director
Campus Development Office

File: 53200-01

RE: Rutherford II

The Campus Development Office is pleased to endorse this Phase II proposal for submission for approval to proceed to Phase III. In regard to the statements in the letter from Diamond Myers and Wilkin, dated June 19, 1970, we make the following comments:

1. (Item 2) The Prime Consultant has been requested to proceed with the design of the Pedestrian Linkage between Rutherford II and Student Union Housing to the east.

2. (Items 3,4,5,&6) These suggestions will be complied with, insofar as design considerations and other restraints will allow.

Consideration of these points will take place with the Long Range Planners prior to proceeding on to Phase III.

W.A. Hiller, P. Eng.
Director

BP/cl

INTER-DEPARTMENTAL CORRESPONDENCE

TO Mr. B. Pratt, Assistant Project Officer
Campus Development

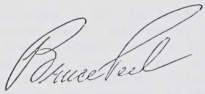
DATE June 2, 1970

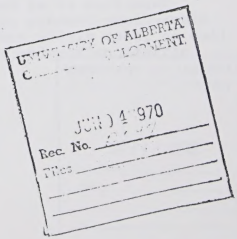
FROM Bruce Peel, Librarian to the University

Re: Rutherford II - Design
Development Phase II Report

I have read this report and find that it conforms to all of the program requirements as specified in the revised detailed program presented by the Library Building Committee to the Campus Development Committee in the form of Document #1900-25 on April 21, 1970.

BBP/meb





A. J. Diamond Architect Barton Myers
R. L. Wilkin Architect
Associated Architects and Planners

10920 - 88th Avenue
Edmonton 60
Alberta
(403)432-7491

49 Avenue Road
Toronto 180
Ontario
(416)920-3911

Date 19 June 70
Reference 6902

Mr. W. A. Hiller, Director
Campus Development Office
207 University Hall
University of Alberta
Edmonton, Alberta

Re: Rutherford 2, Phase 2

Dear Mr. Hiller:

We have received the above mentioned report, and, as requested, we would make the following comments and recommendations:

1. The siting of Rutherford 2 is, in terms of the Long Range Development Plan, extremely good. It contributes to the walkway system around the campus core, and will provide an excellent first phase of the central library core which will eventually connect to Cameron Library.

2. To make the linkage to the S.U.H. on the east side is essential; we would recommend that this link be constructed with Rutherford 2.

3. Because the +15' pedestrian linkage within Rutherford 2 is to provide east-west movement (from central campus to the SUH and N. Garneau), we would recommend that the main stair, leading from the court at grade between Rutherford 1 and 2 to the +15 level, be repositioned to reinforce this pedestrian flow. Thus we believe if the stair were alligned in an east-west direction, rather than its present north-south direction, it would be more widely used, as well as facilitating the heavy pedestrian traffic expected.

UNIVERSITY OF ALBERTA
CAMPUS DEVELOPMENT
JUN 22 1970
Rec. No.
Files

4. In keeping with the Long Range Development Plan, we would recommend only one entrance - exit from 112 Street to the service area on the east side.

5. Emergency vehicle access should be provided from the service area to the north & south for access into Arts Court and south of Rutherford.

6. For the preservation of the dignity of the original Rutherford Library, we believe it is unfortunate that the two enclosed service stairwells on the east and west of the galleria should visually cut off the old facade. If the stairs were repositioned and closer to the new library and if the intermediate space between the buildings were glazed, Rutherford 1 would remain visually a separate entity, as it deserves to be. The same would be true of the skylight truss over the galleria; if its supporting members could be kept free of the cornice of Rutherford 1, the integrity of the facade could be better maintained.

Our comments are minor ones, we believe the building to be successful in its contribution to the campus, and we would recommend its approval to proceed into Design Phase 3.

Yours very truly,

Barton Myers

BM/cq

cc: Mr. Blake Pratt - Campus Development Office
Mr. R. L. Wilkin

N.B. Our Toronto address is changed to:
322 King Street West
Toronto 135, Ontario

CAMPUS DEVELOPMENT OFFICE
DIRECTOR: W. A. HILLER

THE UNIVERSITY OF ALBERTA
EDMONTON, CANADA

PROJECT COST SUMMARY ESTIMATE

BUILDING North Garneau Library - Phase I FILE # 53200-04

THE BOARD OF GOVERNORS' APPROVED TARGET COST (Includes Expense Class 911 to 925) $ 3,500,000.00

Expense Class	Expenditure Description	C.D.O. Estimate
911	Preliminary Costs (Demolition, rental of equipment, re-routing of utilities site development, soil testing, surveys, landscaping)	8,000
913	Consultants Fees (Architects, Engineers, special consultants, Clerk of Works (if employed by project)	204,700
915	General Contract (General Contractor, change orders)	3,245,000
917	Separate Contracts (Casework, kitchen equipment, built-ins, etc.)	included in account 915
919	Other Construction Costs (Alterations, Physical Plant charges, etc.)	10,000
921	Miscellaneous (advertising, administrative charges, appraisals, equipment rentals, freight, insurance, permits, taxes, testing, travel, printing, move-in & telephone)	16,075
923	Mortgage and Legal Fees (Registration, interest during construction, legal fees, etc.	
925	Works of Art (1/2 of 1%)	16,225
	Sub Total Class 911 to 925	3,500,000
	Equipment (Faculty projection)	341,780
	Furniture (Faculty projection)	
	Sub Total	341,780
	TOTAL	3,841,780

BUILDING AREA ESTIMATES
Net Square Feet 100,020
Gross Square Feet 137,550 @ $ _____ per sq. ft.

THE BOARD OF GOVERNORS
APPROVED TARGET NET SQ. FT. = 100,000

Date July 2, 1970 Prepared by: _____

C.D.O. June, 1969

1 ARCHITECTURAL
DESIGN DEVELOPMENT

PROGRAM

UNIVERSITY REQUIREMENTS

The detailed program (Document #1900-24) which was used as a basis in the preparation of Schematic Design Phase 1 was re-examined by the Library Building Committee. This re-examination resulted from a decrease in the expected acquisitions rate based upon the projected operating budget for the next six year period, and the recent announcement of a maximum enrollment of 25,000 students.

As a result, proposed changes to the detailed program were presented by the Library Building Committee to the Campus Development Committee in the form of Document #1900-25 on April 21, 1970, wherein the ammendments to the program were approved and serve as a basis for this design development.

The final detailed space allotment is as follows:

Stacks		61,600 sq. ft.
Reader Areas		
A. Students - 668 seats		
B. Faculty - 30 seats		18,500 sq. ft.
Reference Department		
A. Reference Collection -	3,350 sq. ft.	
B. Service Counters -	300 sq. ft.	
C. Seating -	1,800 sq. ft.	
D. Work Room -	1,200 sq. ft.	7,200 sq. ft.
Catalogue Area		2,870 sq. ft.

Circulation Department		
A. Book Return Area -	1,400 sq. ft.	
B. Book Sorting -	400 sq. ft.	
C. Desk and Work Area -	2,100 sq. ft.	3,900 sq. ft.
Periodicals Department		
A. Reading Room -	2,850 sq. ft.	
B. Work Areas -	1,400 sq. ft.	4,250 sq. ft.
Shipping and Receiving		500 sq. ft.
Storage Area		500 sq. ft.
Staff Room		700 sq. ft.
TOTAL SPACE ALLOTMENT:		100,020 sq. ft.

SITING

UTILIZATION

The proposed siting of the Rutherford 2 Stage 1 Building is the result of the refinement of siting indicated in the Schematic Design Phase 1 Document which was developed in accordance with the terms of reference set forth by the University authorities.

GENERAL

Stage 1

Is designed to accommodate social sciences/humanities collections to be used by a general student population through the implementation of an open stack system. The major portion of the building is to be occupied by stacks and reader areas, also included are catalogue, circulation, reference and periodicals departments.

Stage 2

Includes expansion of stacks and related reader areas. The processing departments presently located in the Cameron Library will also be accommodated at this stage. A high percentage of the added library material will be of research nature, necessitating a change-over to the controlled stack system in most areas.

Stage 3

Includes major expansion of the stacks and related reader areas.

The present uncertainty of exact space allotment at Stage 2 and Stage 3 necessitates conclusions only in form of Schematic possibilities which were developed during the schematic design process. An overall library

GENERAL

Stage 3 (Continued)

development plan has been prepared in further detail, which is included as part of this submission.

RELATIONSHIP TO THE LONG RANGE DEVELOPMENT PLAN

1. An east-west elevated walkway is incorporated within Stage 1, and will be continued throughout subsequent staging.

   The Library's elevated walkway is designed to be interconnected with the proposed student union housing mall.

2. Linkage with Rutherford Library occurs by means of the galleria, which serves as a climate controlled entry space to both libraries. The galleria also facilitates the east-west elevated pedestrian walkway.

   The Cameron Library is linked in subsequent staging.

3. Student rest areas, display areas, kiosks, etc., form part of the pedestrian easement at the galleria.

4. Grade entrances are provided at both sides of the galleria, wherein access to the elevated walkway occurs. The placement of the elevated walkway system within the galleria permits total conformity with the University's requirements regarding walkway systems and resolves the security problem.

RELATIONSHIP TO THE LONG RANGE DEVELOPMENT PLAN (Continued)

5. Vehicular traffic gaining access off 112th Street for service and book depository purposes, which occurs at the east side of the structure, is visually separated by means of sloping berming and a lowered parking surface. The walkway linkage with the proposed student union housing will provide an additional visual screen.

6. Utility access is positioned in the northwestern proximity of the basement level where electrical power, telephone lines and water lines enter off the service tunnel, which runs in an east-west direction below the building.

OTHER DEVELOPMENTS OR EXISTING BUILDINGS

1. Rutherford Library

   The close proximity of the existing Rutherford Library has permitted to turn the space between the two buildings into a climatically controlled enclosed space, which will be fully utilized by the University population through the use of the walkway and entry into both libraries.

2. Arts Building

   The library has been designed to conform aesthetically with its neighbour through the use of brick and compliance with the stone accentuations which also occur on the existing Rutherford Library.

OTHER DEVELOPMENTS OR EXISTING BUILDINGS (Continued)

3. Student Union Housing

   The linearity of the proposed adjacent housing structure complements the Rutherford - North Garneau relationship.

   Elevated walkway linkage and service vehicle access has been developed in conjunction with the housing design information available to date.

4. Service Tunnel Phase IIB

   The proximity of the Service tunnel located directly below the siting of the proposed Library has determined the spacing of the structural grid on the east-west axis.

5. Power Plant and South Lab

   An evaluation of the potential to modify these structures to Library use, is to be carried out at subsequent staging. If preservation of the structures is not feasible, then demolition is to be carried out to allow the completion of the Library spine link with the Cameron Library.

DESIGN

APPLICATION OF CONCEPT

Space allocation was developed in accordance with the Architectural Design Concept previously outlined in the Schematic Design Submission, with minor changes being implemented to conform with the revised building program.

BASEMENT LEVEL

Includes Mechanical and Electrical equipment rooms. Provisions are also included for the physical plant requirements at this level. A ceiling knock-out panel is provided to facilitate direct access to the exterior for bulky equipment movement purposes.

GRADE LEVEL

Includes stacks, reader areas and shipping and receiving department. The grade surface between the two libraries becomes the galleria floor which is designed to serve high density pedestrian use.

The allocation of stacks and reader areas is of temporary nature at this level. The relocated processing departments from the Cameron Library are planned to be located in this area during subsequent staging of the structure. The grade pedestrian movement pattern has been preserved by maintaining existing sidewalks and street paving, wherever possible. The central door is for staff and parapalegic use only.

SECOND LEVEL

Consists of the catalogue, circulation and reference departments,

SECOND LEVEL (Continued)

together with the required public movement areas. The determination of entrance into the library at this level resulted from the proximity of the elevated walkway system. End walls terminating the walkway include knock-out panels permitting continuation of walkway system in the future.

THIRD LEVEL

This level accommodates stacks, reader areas, periodicals department and staff room. The periodicals department is located at the southern sector of the floor, taking full advantage of the galleria space, through its adjacent orientation, where the extensive use of glazing permits visual interrelationship between the new structure, the existing Library and the galleria itself.

FOURTH AND FIFTH LEVELS

Include stacks and reader areas. The south facades are opened into the galleria, similar to the third level treatment.

The areas in the proximity of west facade have been designed bearing expansion of subsequent stages in mind. Construction details permitting efficient removal of the west wall will be designed accordingly.

The building being planned on a 27 ft. by 27 ft. bay system allows a 4'-6" basic building module. As a result, five double faced stack rows can be accommodated per bay, with an additional row occurring

FOURTH AND FIFTH LEVELS (Continued)

on column lines. Although the stacks are planned to run in north-south direction, the square bay system permits a ninety degree stack rotation if required. Strict adherence to the basic module introduces a dimensional uniformity of all building components.

The reader areas are positioned at peripheral allocations of the stack floor levels with the exception of the faculty studies, which occur in more central positions. An attempt was made to provide a variety of readers' spaces through variations of direct and indirect natural light.

External glazing occurring at permanent stack levels (Third, Fourth and Fifth) is minimized in order to limit sunlight and the potential of excessive heat loss, both of which being non-conducive to an acceptable book storage environment.

Parapalegics gain access into the Library through grade level entry, located in the galleria, where an elevator is positioned nearby. Special washroom facilities will also be provided within the library for the wheel-chair users.

The treatment of the facades is based upon the desire to match the spirit of the existing quadrangle space, which is dominated by the neoclassical Arts Building and Rutherford Library, bearing in mind a proposed new neighbour, the Student Union Housing over 112th Street.

The similarity of building height and materials is intended to serve as common denominators enhancing unity between the Arts Building, the Rutherford Library and the proposed structure.

DESIGN

APPLICATION OF CONCEPT

The projections of three storey piers are used to reduce the scale of the structure in order to make it more in keeping with adjacent buildings. The piers also serve as supports of the larger upper floors, thus diminishing the cantilevers.

The external composition of the building is unified by a continuous articulation of top storeys. Such treatment would be continued in subsequent staging in order to achieve overall uniformity as the structure grows.

ARCHITECTURAL FINISHES

The proposed finishes result from the following:

A. Aesthetic Requirements
B. Durability
C. Ease of Maintenance
D. Cost
E. Code Requirements

EXTERIOR

The dominant material is brick, which will be used in a variety of masonry detailing. Extensive efforts will be made in selection of color and texture of the brick in order to achieve harmony with nearby existing structures.

Spandrel panels together with centre mullions, occurring between the brick-clad piers, are of precast concrete. The color and texture of the concrete is intended to match the stone work of the Arts and Rutherford Buildings.

Brick precast panels are intended to be used on the west facade, in order to permit an efficient method of removal and reuse at such times as it becomes necessary in subsequent expansion of the Library to the west. Such wall construction is also planned at future connections of the elevated pedestrian walkway.

Window frames and entrances will be of dark brown anodized aluminum.

EXTERIOR (Continued)

Glazing will be hermetically sealed double glazing with tinted coloration, at east, west and north facades. Single tinted glazing will be used at the south elevation, which adjoins the heated galleria.

The galleria skylights, consisting of a barrel vaulted shape, will be of clear double plastic material. The skylights will be supported by a tubular steel tetrahedral space frame.

INTERIOR

Ceilings occurring at areas other than stacks will consist of T-Bar and acoustic tile ceiling system.

At the stack floor levels, the ceilings will be left exposed, with coffered slabs being painted. The peripheral areas used by readers will also have a T-Bar and acoustic tile ceiling system.

Internal walls about service cores and fire stairs, which are of permanent nature will be clad with brick. Other partitions which separate various departments and provide sub-division within the departments will be of moveable partition type. Glazing within the walls, wherever required, will be provided as an integral part of the wall system.

Interior concrete columns and some coffered concrete slabs will be left exposed. The texture and color will be carefully selected

INTERIOR (Continued)

and precautions will be taken to ensure proper finishes.

Flooring materials in excessively used public spaces such as the galleria and the elevated pedestrian easement will be of quarry tile or paving brick. Carpeting will be used at reader areas, while stacks and the balance of the areas will be accommodated by resilient flooring materials.

More commonly used doors will be of plastic laminate finish, while the remainder will be of wood.

Millwork will be constructed of wood and plastic laminate, as the type of use, appearance and cost warrants.

The internal finishes will be selected in collaboration with the acoustical consultant, to ensure acceptable acoustical conditions.

Recommendations prepared by the Department of Physical Plant regarding the building materials will be incorporated during the preparation of construction documents.

ACOUSTICS
DESIGN DEVELOPMENT

NOISE LEVELS

Noise levels in general will be designed for a maximum level so as not to be objectionable, and a minimum level to ensure satisfactory isolation between areas with the proposed use of movable office partitioning and continuous acoustical ceiling. In general, the maximum level will be a modified NC 35 criterion and the masking level will be maintained at a preferred speech intelligibility level (PSIL) of 30 dB.

Based on preliminary investigation, noise from the proposed louvres in the galleria will not be a problem, nor will noise in the mechanical room. However, low frequency noise from the large supply air fans will require highly absorptive fan plenums combined with silencers, and radiated noise from the terminal reheat boxes will require special attention. The return air system has not yet been evaluated in detail but provision for silencers should be made.

PRIVACY

It is desired to use a commercial moveable partition whose rating in the field is expected to be approximately STC 35. This should be satisfactory in most areas when used in conjunction with a good quality mineral acoustic ceiling and with control of the masking level. Areas of differing noise levels appear to be well isolated in general and little or no requirement for special construction, other than the use of barriers in some areas, is anticipated.

ACOUSTICS
DESIGN DEVELOPMENT

The requirements for acoustics are being designed under three general, interrelated divisions as follows:

1. Room acoustics, or freedom from disturbing echos and excessive reverberation. This area is particularly critical in the large enclosed galleria.
2. Noise levels, primarily from the mechanical system, but also from the intended use of the building for other activities such as typing and office equipment uses, pedestrain movement etc.
3. Privacy, or more generally, freedom from distraction and irritation. This area applies both to the study and to the work areas within the buildings.

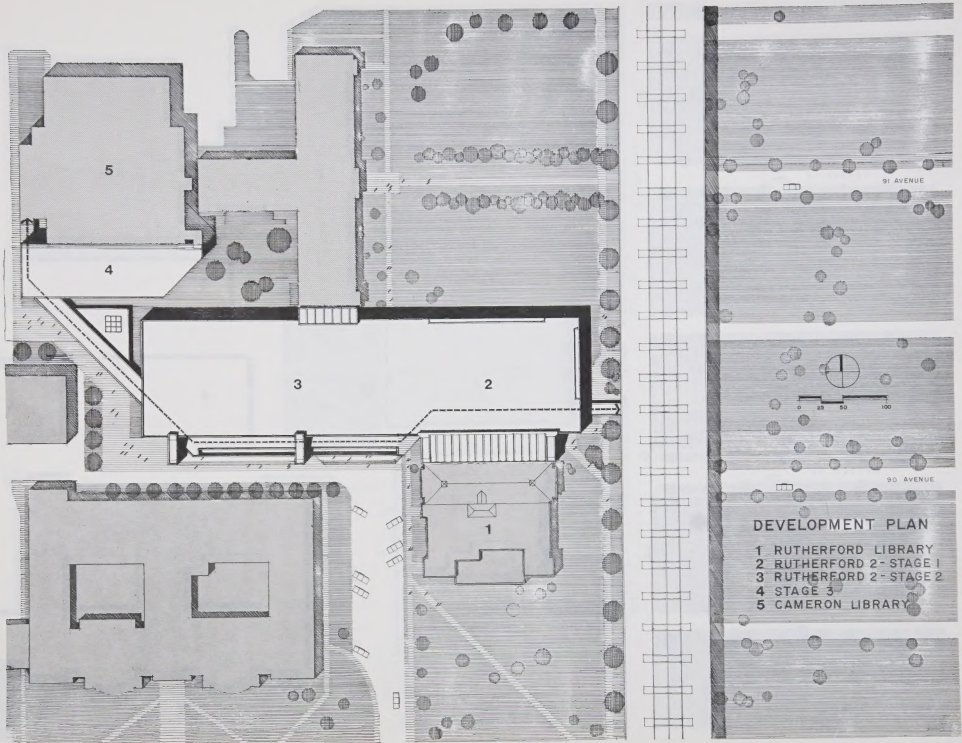
ROOM ACOUSTICS

Absorption and diffusion will be specified to obtain a satisfactory acoustical environment consistent with reasonable economics.

The present design of the galleria indicates a reverberation time of approximately 10 seconds which is excessive. Barron & Strachan are currently evaluating the requirements for galleria acoustics as the proposed exposure of brick and glass will render any unnecessary safety margins both difficult and expensive to achieve.

Several large open galleria type structures in Western Canada are currently being investigated as to both noise levels and reverberation time versus acceptability.

The stack areas will be considered as areas of occasional occupancy and will be given a lesser quality of acoustics than the reader areas. This approach is consistent with the absence of carpeting or acoustical tile, a somewhat higher masking noise level, and lower lighting levels.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DEVELOPMENT PLAN
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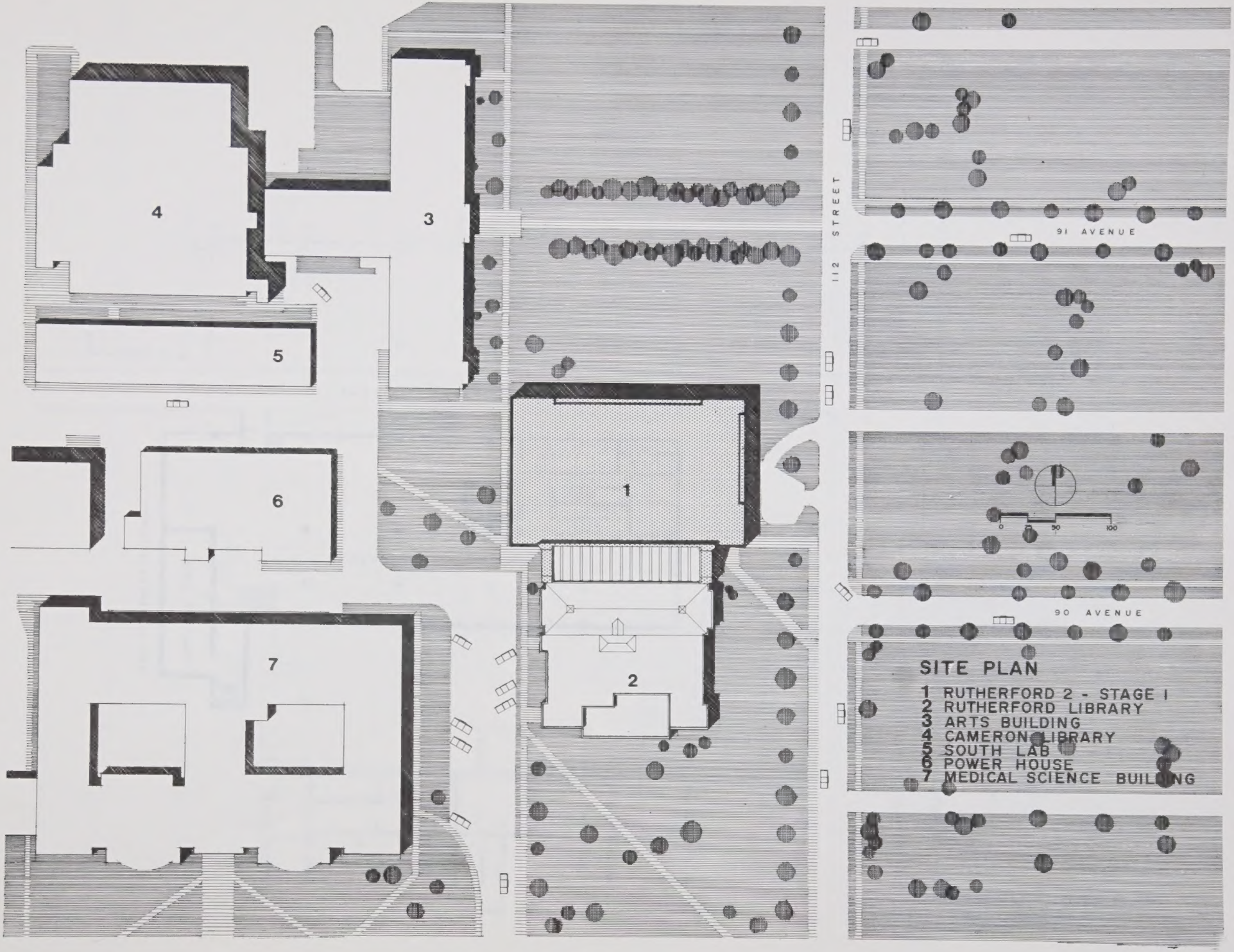
2 RUTHERFORD 2 - STAGE 1
3 RUTHERFORD 2 - STAGE 2
4 STAGE 3
5 CAMERON LIBRARY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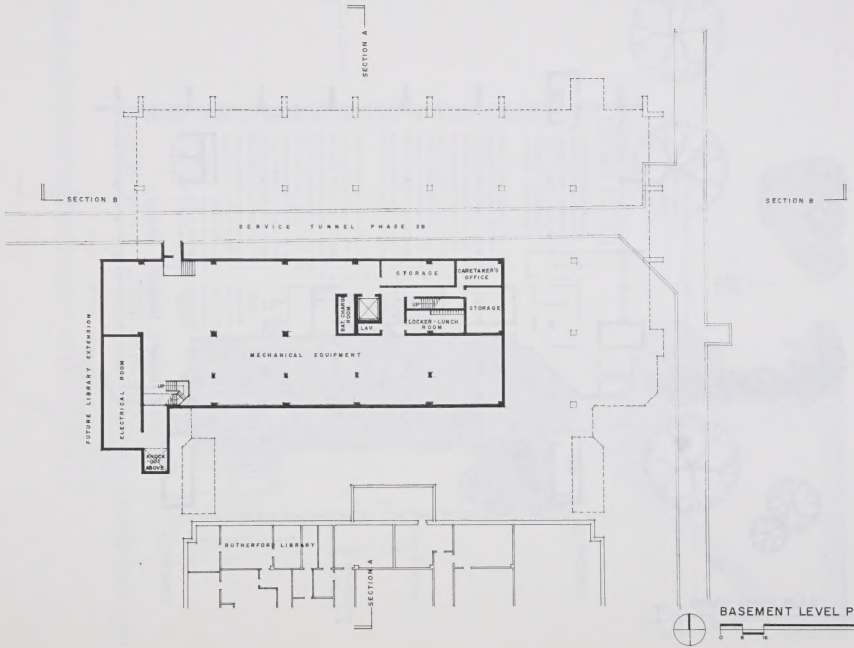
SITE PLAN
1 RUTHERFORD 2 - STAGE I
2 RUTHERFORD LIBRARY
3 ARTS BUILDING
4 CAMERON LIBRARY
5 SOUTH LAB
6 POWER HOUSE
7 MEDICAL SCIENCE BUILDING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SECTION B
SERVICE TUNNEL PHASE 2B
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CARETAKER'S OFFICE
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KNOCK OUT ABOVE
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BASEMENT LEVEL PLAN
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SECTION A
SECTION B
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SECTION B
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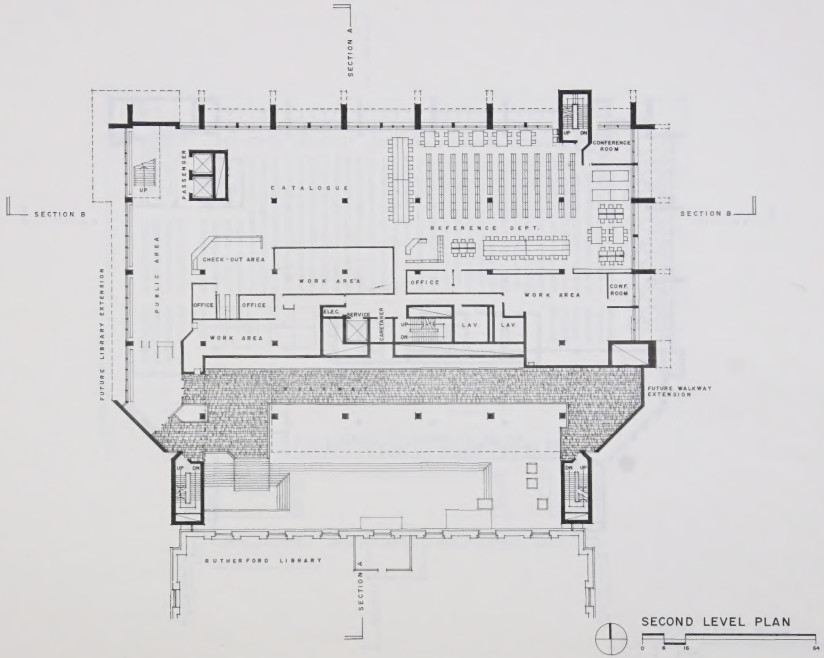
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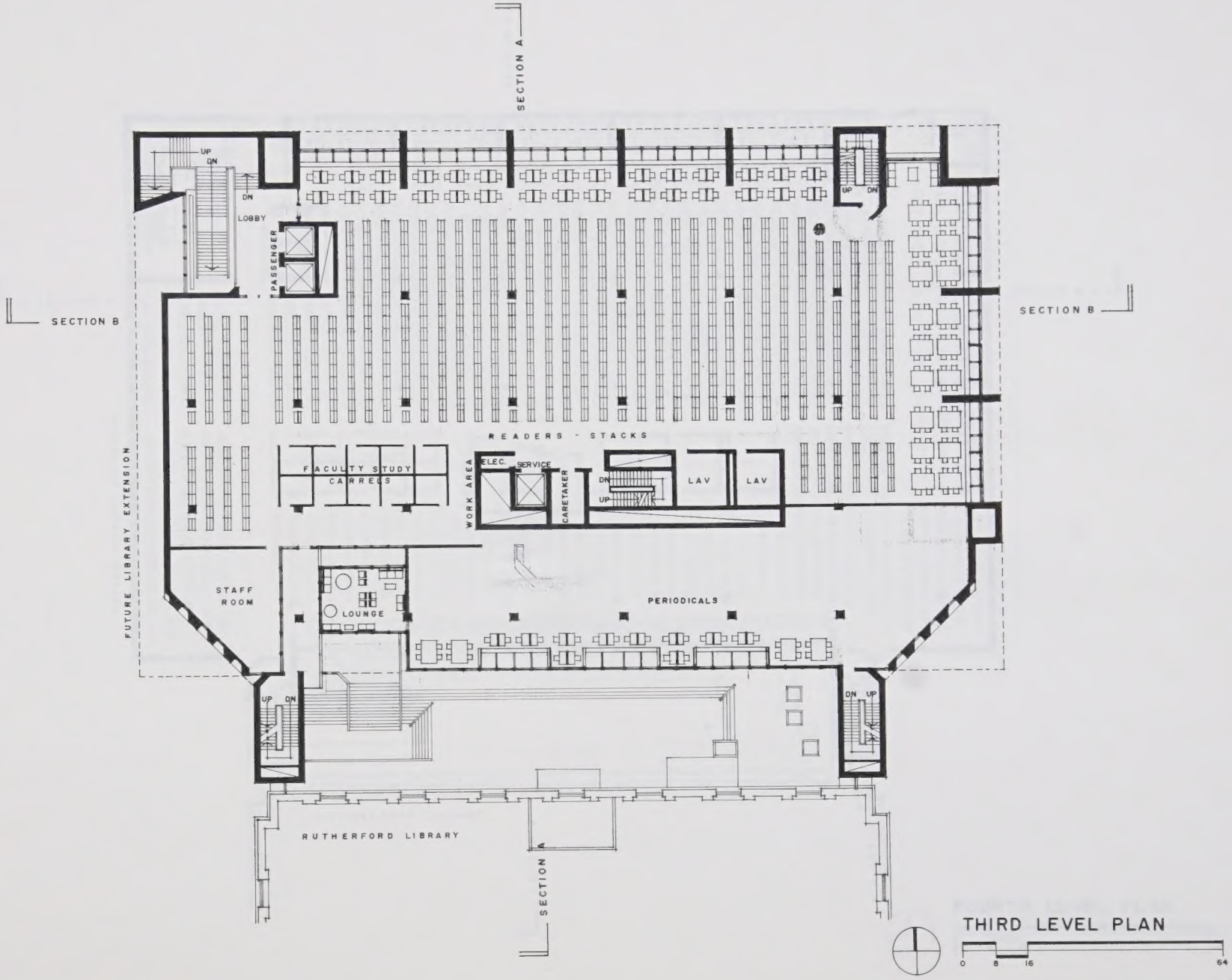
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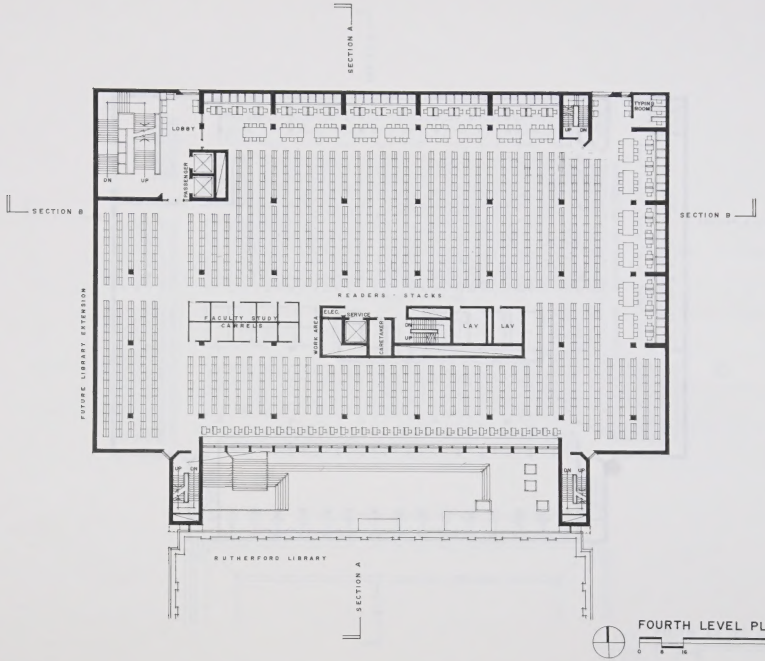
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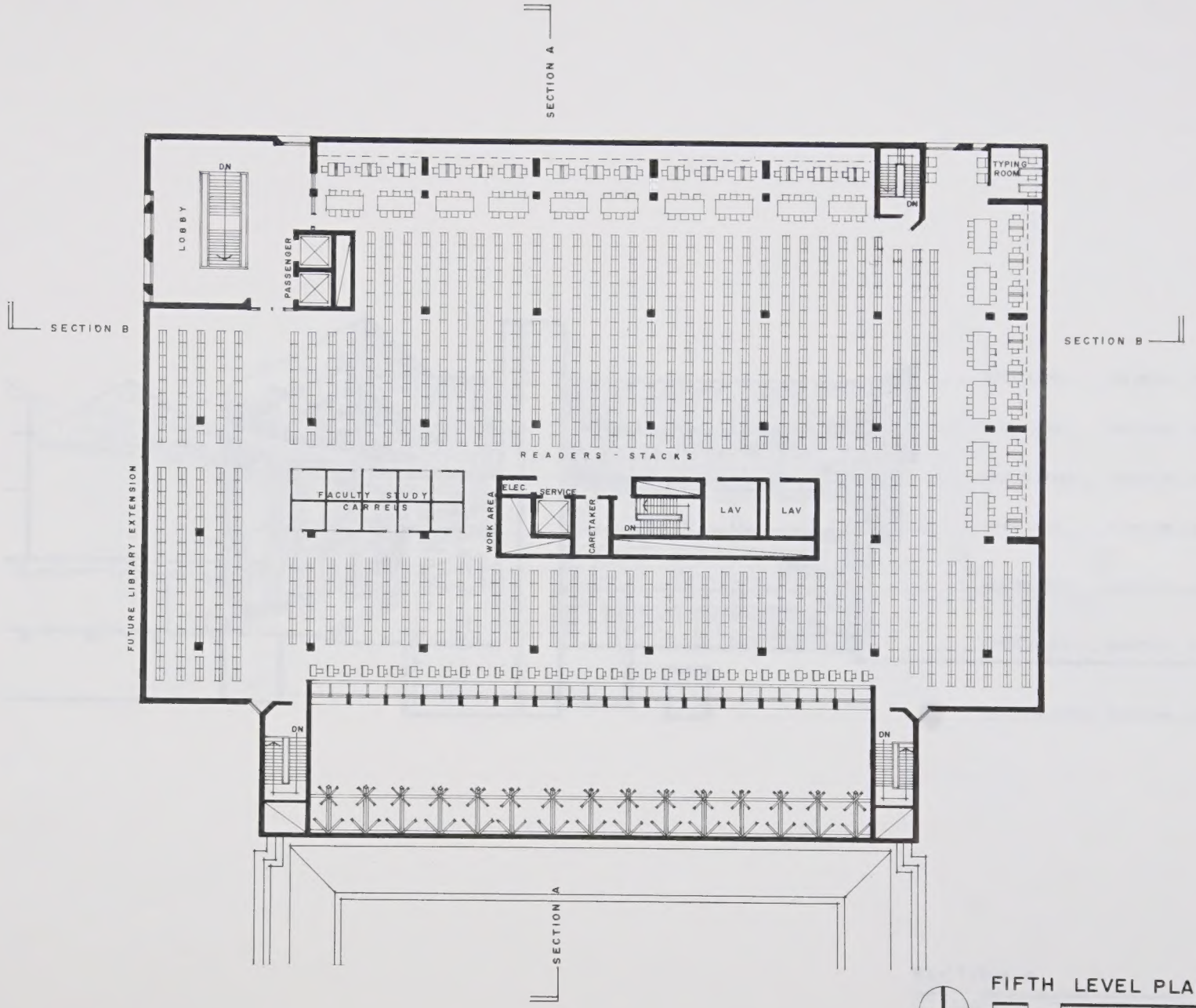
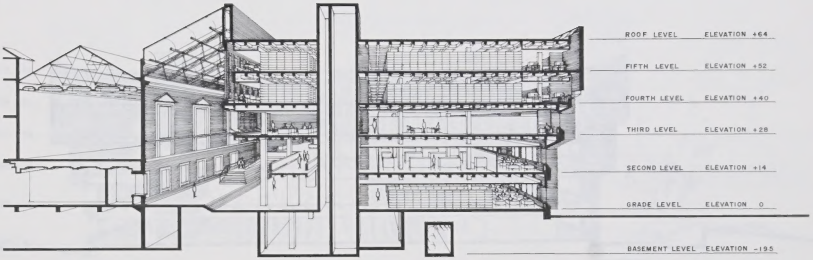


FIFTH LEVEL PLAN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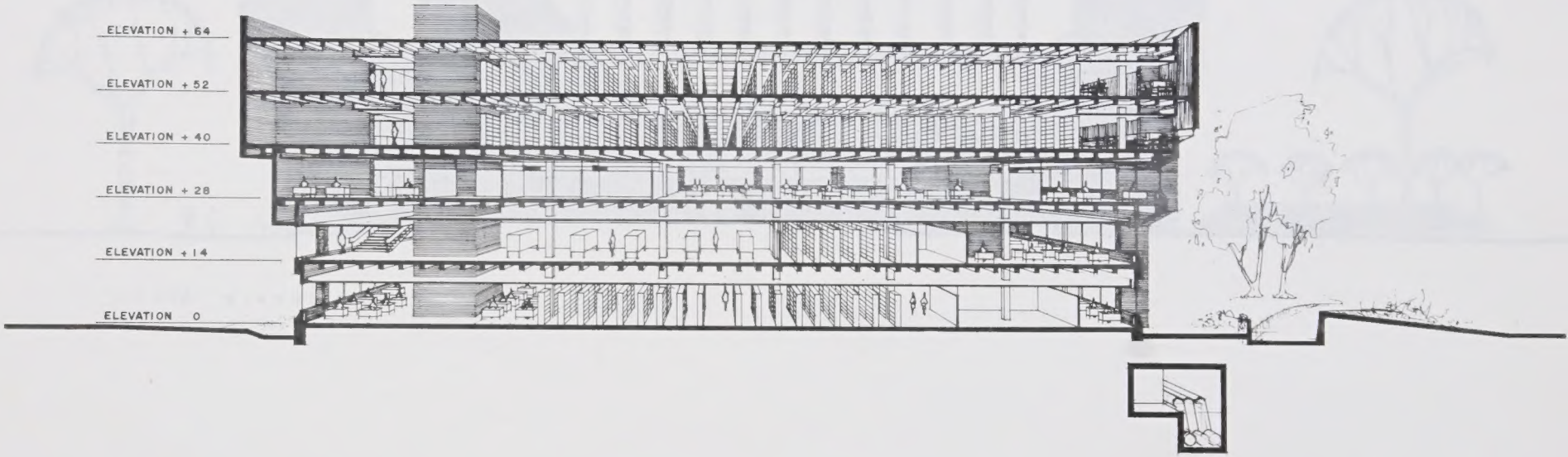
FIFTH LEVEL ELEVATION +52
FOURTH LEVEL ELEVATION +40
THIRD LEVEL ELEVATION +28
SECOND LEVEL ELEVATION +14
GRADE LEVEL ELEVATION 0
BASEMENT LEVEL ELEVATION -19.5

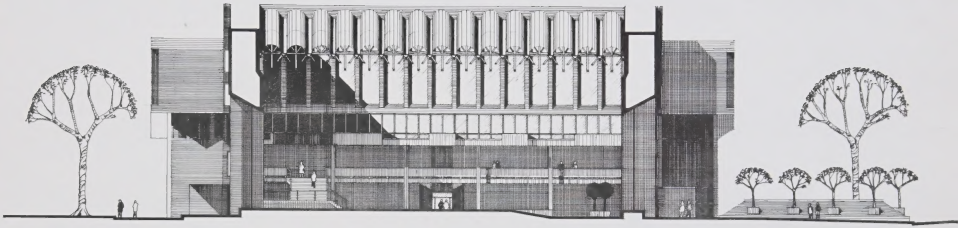
SECTION A

0 8 16 64

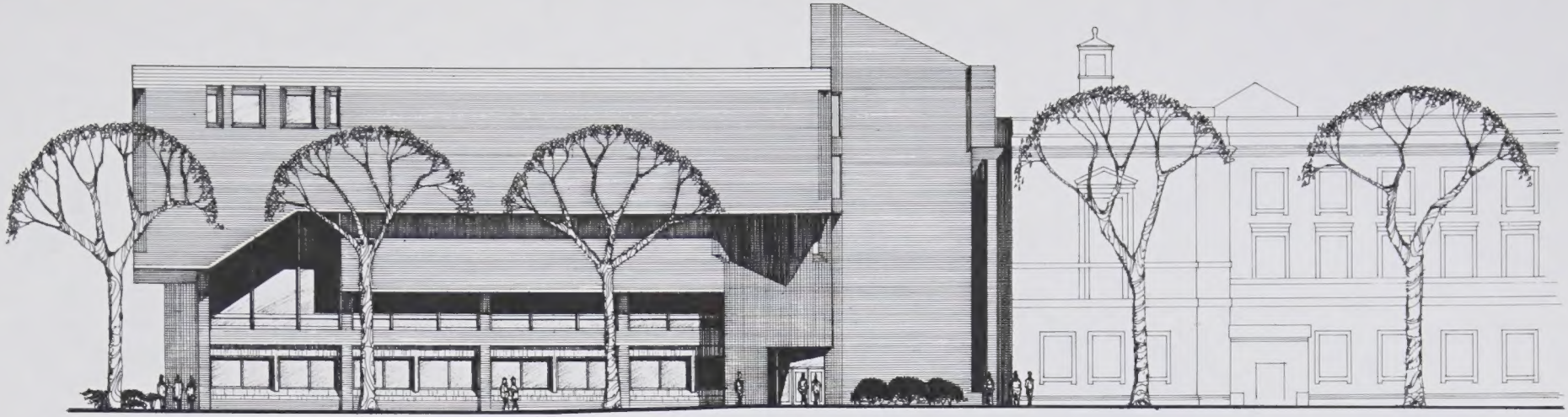


SECTION B

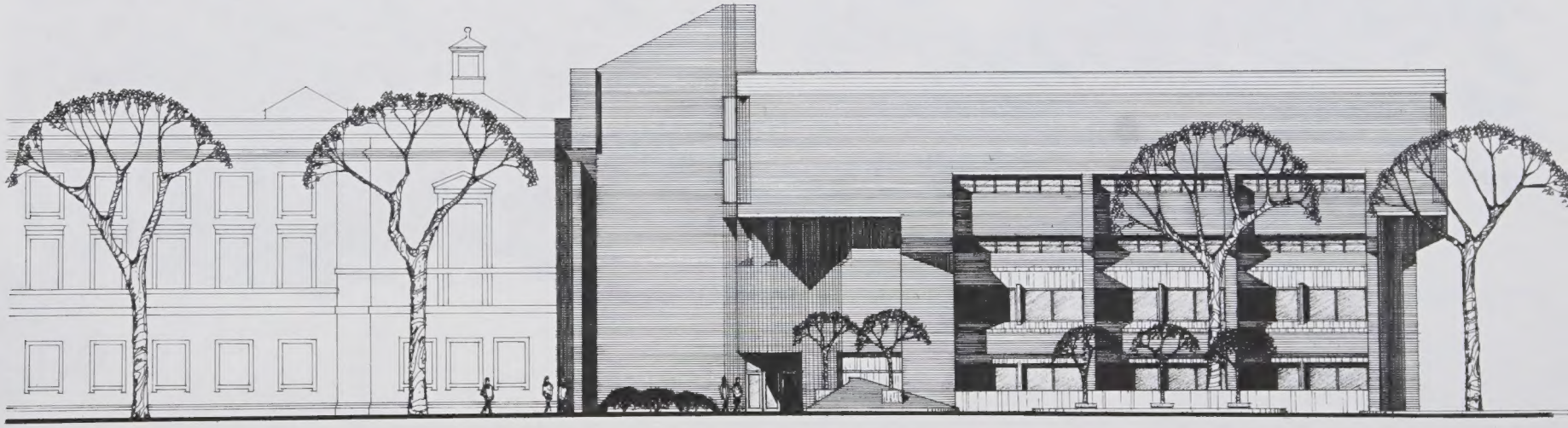
0 8 16 64



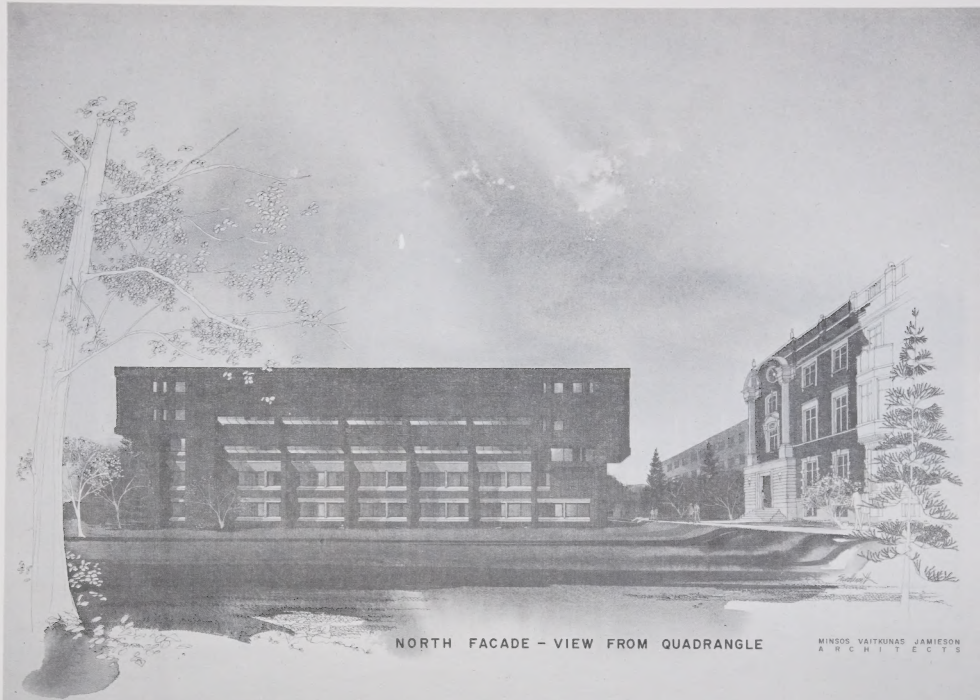
south elevation



west elevation

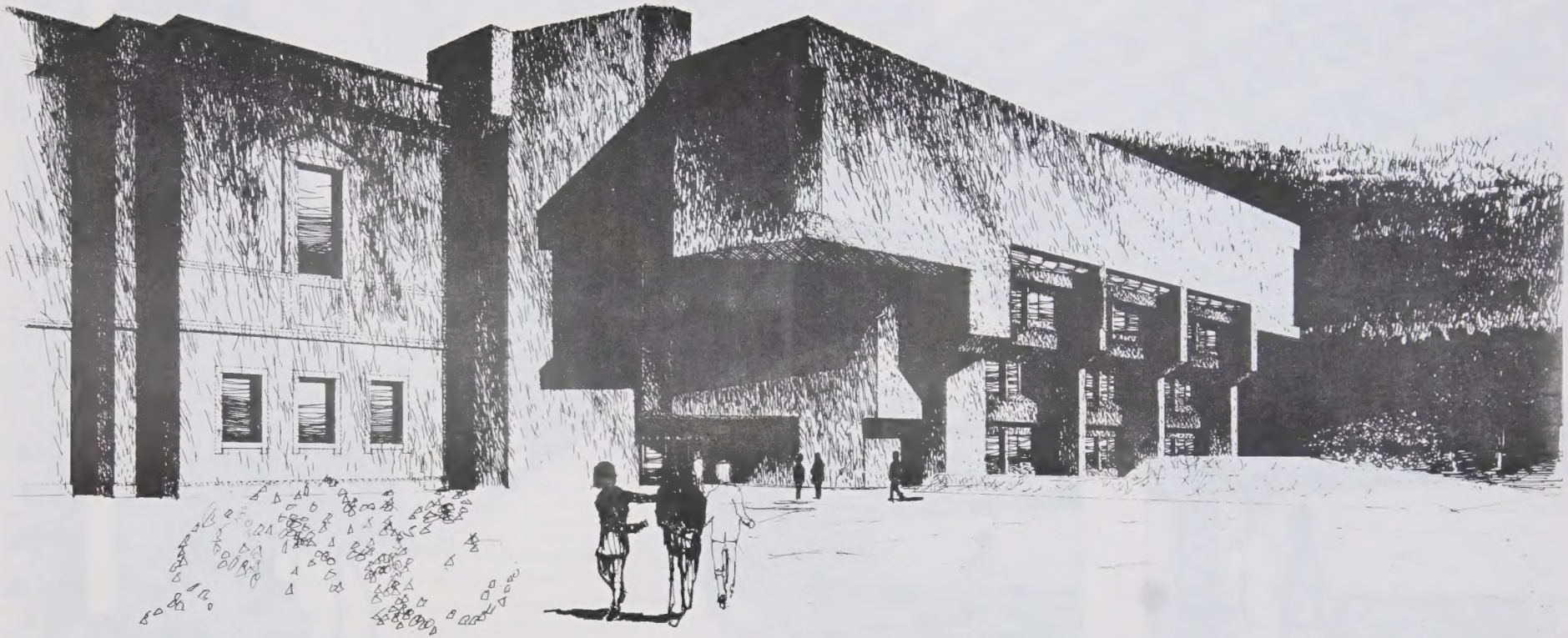


east elevation



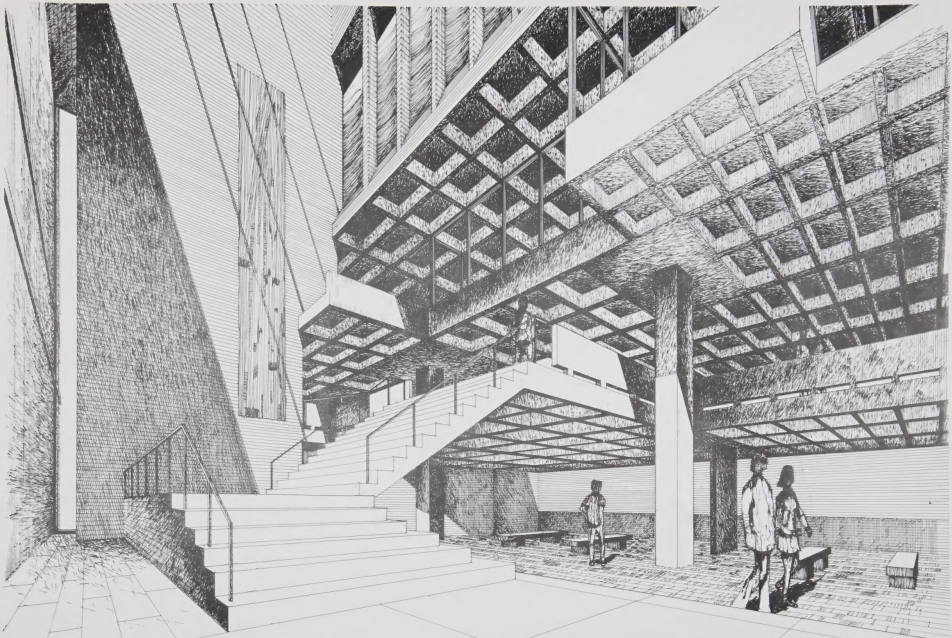
NORTH FACADE – VIEW FROM QUADRANGLE

MINSOS VAITKUNAS JAMIESON
ARCHITECTS



SOUTH EAST VIEW

MINSOS VAITKUNAS JAMIESON
A R C H I T E C T S



GRADE LEVEL - GALLERIA SPACE

MINSOS VAITKUNAS JAMIESON
ARCHITECTS

2 STRUCTURAL DESIGN DEVELOPMENT

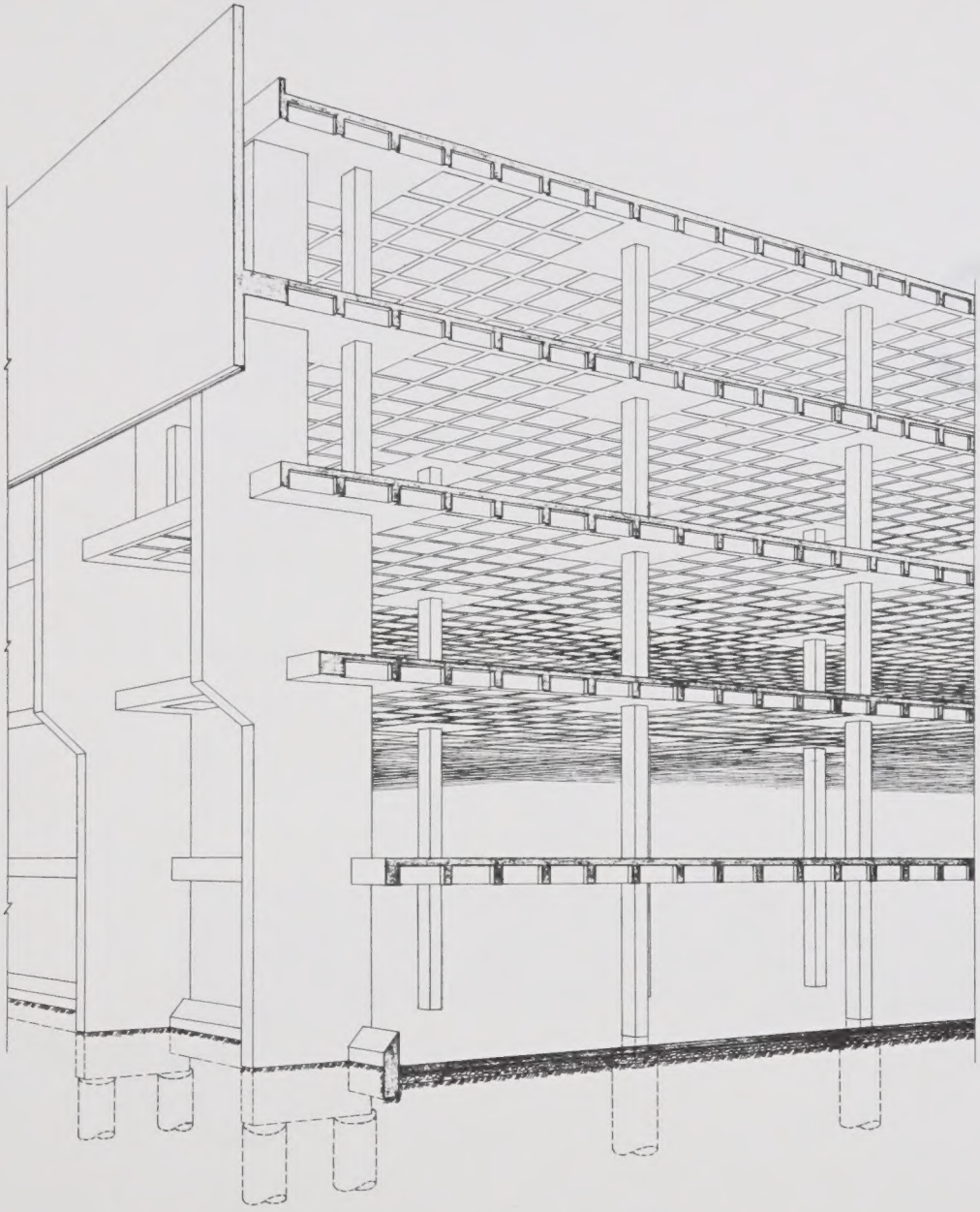
STRUCTURAL

DESIGN DEVELOPMENT

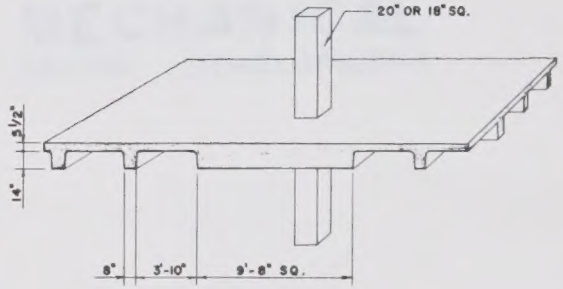
The basic module used throughout the building is 4'-6" and results from library stack requirements. The resulting structural bay size, considering this module, is 27'-0" x 27'-0". Generally the entire structure may be of this bay system size excepting for several areas where special structural provisions are anticipated.

The preliminary selection of the floor system is a reinforced concrete waffle system directly related to the 4'-6" module. Three alternate framing systems have been studied in detail. The preliminary selection and alternates were decided upon after reviewing eleven structural systems. The system found most suitable is, reinforced concrete waffle having 4'-6" module with composite stringer beams on west and south side at 4th, 5th floors and roof. The ribs for the 13'-6" cantilever portion at above mentioned levels will be reinforced with steel beams.

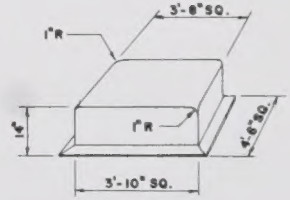
Foundations for the project are anticipated to be founded in the sub-surface regions at from 20' to 35' below grade.



PERSPECTIVE SHOWING STRUCTURAL FRAMING



TYPICAL COLUMN HEAD



TYPICAL FORM PAN

3 MECHANICAL DESIGN DEVELOPMENT

MECHANICAL
DESIGN DEVELOPMENT

GENERAL

The intent of this report is to present the proposed mechanical systems that will form the basis of design for this building. The systems are based on the information received to date, should deviations be required as may be indicated by design calculations or other factors, such changes will be outlined prior to their incorporation into the design.

It is intended that the heating and cooling calculations and the duct design will be carried out on computer programs.

HEATING AND AIR CONDITIONING SYSTEMS

The design conditions considered for the building are as follows:

Outside: Winter: -35°F D.B. with 15 MPH wind.
Summer: 90°F D.B. and 67°F W.B.

Inside: (a) Building Proper
Winter: 74°F D.B. and 35% R.H.
Summer: 74°F D.B. and 50% R.H.

(b) Galleria Area:
Winter: 65°F D.B. and 25% R.H.
Summer: 80°F D.B. and 50% R.H.

The main air conditioning systems selected are two separate single duct medium pressure systems with reheat terminal units located in the ceiling space. The choice of this system is based on space considerations, first costs, design performance criteria and ease of flexibility and maintenance.

HEATING AND AIR CONDITIONING SYSTEMS (Continued)

The terminal units will provide the final room conditions by thermostat controlled hot water coils for each unit.

The quantity of supply air in the various areas of the building will vary from 6 to 14 air changer per hour depending on the requirements of each room supplied. Provisions will be made to enable the systems to revert to 100 percent recirculation during unoccupied periods.

The central air systems will consist of equipment indicated on the drawings in this report. We are recommending that good efficiency filters, (ASHRAE Guide recommends 85% N.B.S., however, at least 60% should be provided) with combination roll/bag filters being used; the control of dust is important in libraries as dust soils books decreasing their utility and life. The humidification shall be by means of steam grid humidifiers.

The requirements for proper noise and vibration control will be reviewed thoroughly with the consulting acoustical engineer. The use of variable volume systems has not been recommended by the acoustical engineer, however, further investigation will be made to determine whether the savings in operating costs will warrant acceptability of variable volume systems on this project; constant volume units can be provided in areas where constant sound levels are of particular concern.

Where terminal units are located over occupied areas, and where low sound levels are required, the units will have acoustical baffles to reduce radial noise and lined duct or sound attenuators to reduce duct transmitted sounds. Terminal units shall be selected in the capacity ranges with the least casing radiated noise levels. All fans throughout the project will be of the centrifugal type.

MECHANICAL
DESIGN DEVELOPMENT

HEATING AND AIR CONDITIONING SYSTEMS (Continued)

Air supply outlets shall be selected to obtain proper air patterns with slot and/or louvered diffusers being used in the book stack areas; a return air ductwork system will be used to reduce short circuiting problems also in these areas. A mock-up of one typical bay will be carried out by the contractors to confirm final orientation of equipment.

The heating and humidity control, with supplementary cooling of the galleria space will be handled by a separate packaged air supply unit; a portion of the cooling will be provided from the central fan systems.

Thermostatically controlled radiation will be provided for heating stairwells and other miscellaneous rooms; entrances will be heated with cabinet heaters with packaged heating units used for main entrances. Where air cannot be supplied under the window sills (grade level), radiation will be provided to reduce downdrafts.

The heating medium for the systems will be glycol for preheat coils and compensated water (to maximum of 190°F) for the reheat systems and radiation heating; heat exchangers (convertors) shall be used with steam as the primary media.

VENTILATION SYSTEMS

Low profile exhaust fans, complete with the necessary ductwork and grilles, will be provided to remove stale and contaminated air from washrooms, janitor rooms and other areas requiring exhaust ventilation; separate systems will be used for mechanical, transformer, emergency generator, and elevator machine rooms ventilation.

MECHANICAL
DESIGN DEVELOPMENT

STAND-BY FACILITIES

To reduce the possibility of inconvenience due to equipment failures the following will be provided. (A further review will be required.)

(a) Air Systems - Two separate systems completely independent of each other shall be provided. Each system provides air supply for approximately one-half of the area of each floor.

(b) All major heating and cooling circulation, condensate and other pumps shall operate either in parallel or on an alternating basis.

(c) Heating convertors will operate in parallel as needed.

CONTROLS

A complete system of automatic, pneumatic controls will be employed with suitable sub-systems for connection to the central monitoring system. Generally main systems will be manually started and stopped with appropriate safety override features and controls will be designed to fail-safe to heating except for the transformer ventilation system, and domestic hot water which will fail to cooling.

Glycol coils are being used for preheat application on the main supply air systems. Freeze protection will be provided to require the fresh air dampers to the closed position and the return air dampers open, and sound an alarm; a time delay will shut down the supply fan only should a freeze condition still remain with the system operating on 100 percent recirculation.

MECHANICAL
DESIGN DEVELOPMENT

PLUMBING SYSTEMS

The sanitary and storm drainage systems will be connected into the University mains.

The domestic cold water will be obtained from the main in the utilities tunnel. Domestic hot water will be from a storage tank, with a separate heater and tank circulation pump; pumped recirculation system will be provided.

The plumbing fixtures shall be selected to meet the requirements of the program.

A dry mop system will be provided in accordance with the University requirements.

A venting system shall be provided for the plumbing systems also separate vents to atmosphere for services such as sumps, steam relief valves and like.

FIRE PROTECTION

Fire hose cabinets and standpipes with fire department valved connections will be provided together with sprinkler systems in certain areas as required by the National Building Code, with approval obtained from the Provincial Fire Marshall and the City of Edmonton Fire Chief.

Fire and smoke detection devices will be provided in accordance with the National Building Code and the University requirements.

MECHANICAL
DESIGN DEVELOPMENT

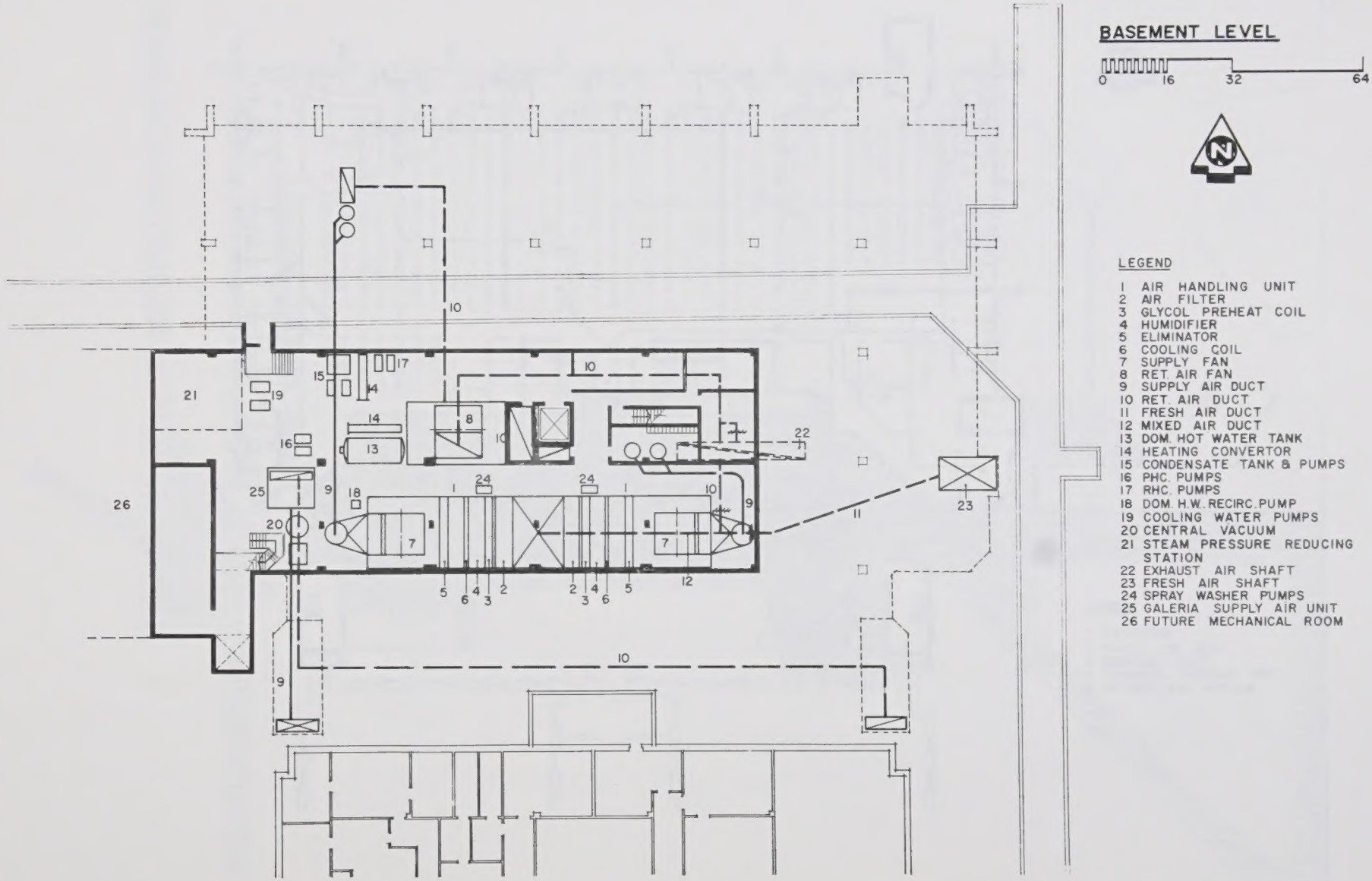
BUILDING SERVICES

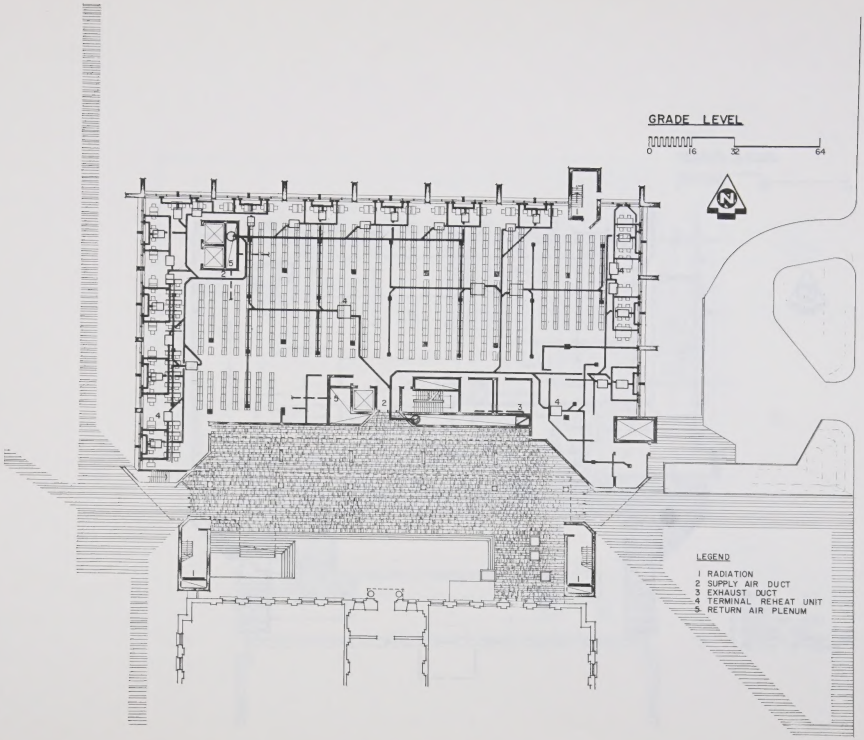
All necessary steam and condensate, chilled water, compressed air and domestic cold water connections shall be made into the central utilities system. The services for this project shall be sized to accommodate Phase I and II construction stages only: separate services will be required for the Phase III stage of construction.

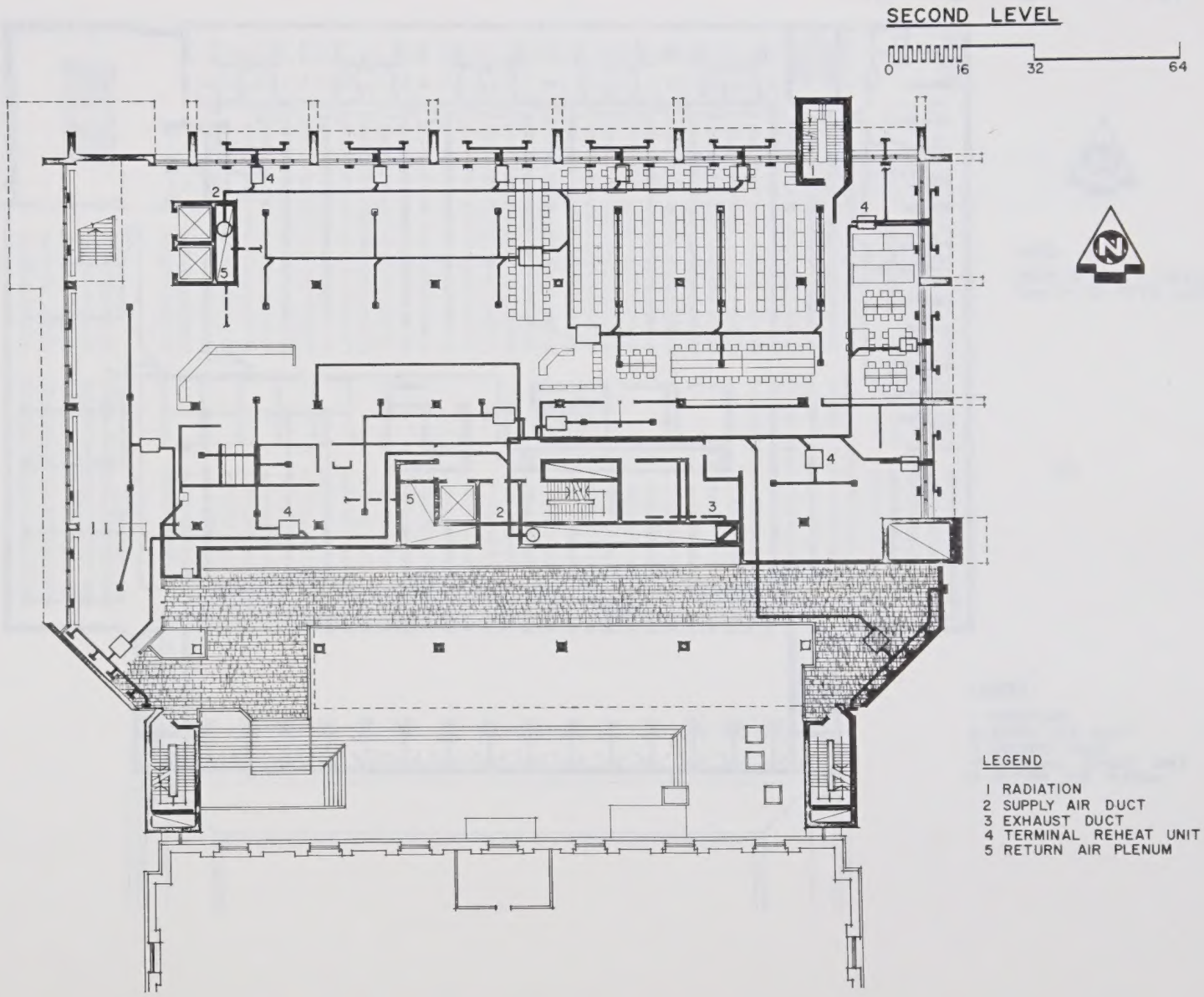
The high pressure steam shall pass through parallel two stage reducing valve stations (sized for Phase I capacity only) and for the cooling system will be provided with the necessary automatic controls, all as outlined in the report prepared for the University regarding the utilities system. Metering shall be provided for condensate return, chilled water, natural gas and domestic water complete with isolation and by-pass facilities.

DRAWINGS

The drawings indicate basic concepts only and do not include all the details necessary for the University Campus Development Office and Physical Plant to fully evaluate the mechanical work proposed. A meeting, therefore, will be required with representatives of these departments to review in more detail the drawings, as well as items included in this Phase II Report.

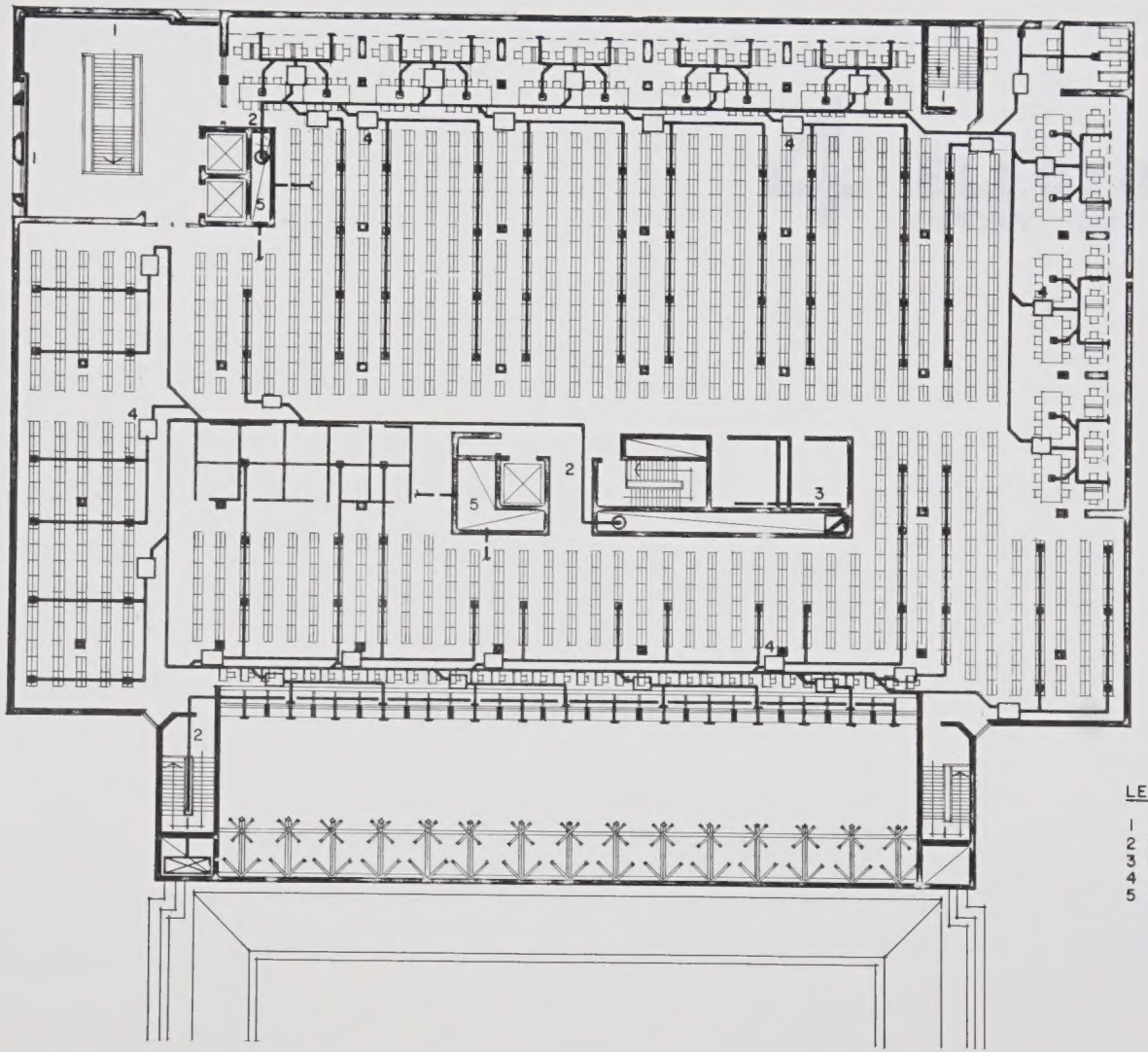

BASEMENT LEVEL
0
16
32
64
N
LEGEND
1 AIR HANDLING UNIT
2 AIR FILTER
3 GLYCOL PREHEAT COIL
4 HUMIDIFIER
5 ELIMINATOR
6 COOLING COIL
7 SUPPLY FAN
8 RET. AIR FAN
9 SUPPLY AIR DUCT
10 RET. AIR DUCT
11 FRESH AIR DUCT
12 MIXED AIR DUCT
13 DOM. HOT WATER TANK
14 HEATING CONVERTOR
15 CONDENSATE TANK & PUMPS
16 PHC. PUMPS
17 RHC. PUMPS
18 DOM. H.W. RECIRC. PUMP
19 COOLING WATER PUMPS
20 CENTRAL VACUUM
21 STEAM PRESSURE REDUCING STATION
22 EXHAUST AIR SHAFT
23 FRESH AIR SHAFT
24 SPRAY WASHER PUMPS
25 GALERIA SUPPLY AIR UNIT
26 FUTURE MECHANICAL ROOM


GRADE LEVEL
0
16
32
64
N
LEGEND
1 RADIATION
2 SUPPLY AIR DUCT
3 EXHAUST DUCT
4 TERMINAL REHEAT UNIT
5 RETURN AIR PLENUM


SECOND LEVEL
0
16
32
64
N
LEGEND
1 RADIATION
2 SUPPLY AIR DUCT
3 EXHAUST DUCT
4 TERMINAL REHEAT UNIT
5 RETURN AIR PLENUM

FIFTH LEVEL

0 16 32 64



NOTE:

THIRD & FORTH LEVEL
SIMILAR TO FIFTH LEVEL

LEGEND

1 RADIATION
2 SUPPLY AIR DUCT
3 EXHAUST DUCT
4 TERMINAL REHEAT UNIT
5 RETURN AIR PLENUM

4 ELECTRICAL DESIGN DEVELOPMENT

ELECTRICAL

DESIGN DEVELOPMENT

GENERAL

The design of the electrical system for the new Rutherford Library II will take into consideration the needs of Stage 1 development as well as for Stage 2. As previously mentioned in the Design Phase 1 report, the use of quality components to maintain the standards of construction, within budgetory guidelines, is essential. The system design shall be geared to the needs of the various disciplines associated within the functioning library, keeping in mind the necessity that the system be flexible enough to adapt to change.

SERVICES

The power supply to the building will be at 13,800 volts (13.8 KV) from the University of Alberta distribution system located in the service tunnel (Phase IIB). Service cables will be installed in cable tray from tunnel access M1-30 to the load center distribution board located in the electrical room. The power supply will be of the dual primary type. The load center power distribution system will ultimately be of the secondary selective arrangement. In Stage 1 the load center power distribution system will be of the primary selective arrangement, with provisions for conversion to the above mentioned secondary selective arrangement.

The 13.8 KV primary equipment shall consist of two metal enclosed manually operated fused interruptor switches, 15 KVA maximum design, 600 MVA three phase symmetrical rating. The interruptor switches shall be complete with power fuses appropriately sized for the power transformers.

The power transformers shall be 1500 KVA of the three phase, 13.8 KV Delta to 600Y/347 volts, three phase, four wire type. The transformers shall be askarel filled with 2-1/2% taps above and two 2-1/2% taps below normal voltage. The transformer shall form an integral part of the load center distribution board.

SERVICES (Continued)

The 600Y/347 volt main secondary distribution equipment shall consist of metal enclosed air circuit breakers of drawout type construction. The air circuit breakers shall be manually charged, stored energy (quick-make) closing mechanism type complete with auxiliary shunt trips. The 208Y/120 volt main secondary distribution equipment shall consist of molded case air circuit breakers, frame sizes as may be required, complete with shunt trip auxiliaries. The main secondary distribution equipment shall form an integral part of the load centre distribution board.

The 208Y/120 volt secondary voltage power transformers shall be sized as required for loads served of three phase, 600 volt delta to 208Y/120 volt three phase, four wire type. The secondary transformers shall be of the air cooled, dry type, with two 2-1/2% taps above and two 2-1/2% taps below normal voltage. The transformers shall be constructed with Class H, 110 degrees C rate of rise over 40 degrees C ambient and shall incorporate provisions for the addition of future forced cooling. The secondary transformers shall form an integral part of the load centre distribution board.

Metering shall be provided on the 600Y/347 volt and 208Y/120 volt distribution systems. On the 600Y/347 volt system, KWHR and KVA demand metering and current/voltage line and phase selective indication will be provided on the 208Y/120 volt distribution systems current/voltage line and phase selective indication will be provided. All metering installations shall be installed and wired to conform with the latest rules and regulations of the City of Edmonton.

Ground fault protection will be provided on the 600Y/347 volt and the 208Y/120 volt distribution systems. The 600Y/347 volt and the 208Y/120 volt systems shall have their own independent ground fault protection scheme. The main breaker and feeder breakers of each system will be protected against ground fault conditions through

SERVICES (Continued)

the use of fully co-ordinated and selective ground fault relaying. The total electrical distribution system shall be designed for a fault level based on 600 MVA at 13.8 KV. A selective tripping arrangement of main and feeder circuit breakers shall be so designed to ensure continuity of service and isolation of fault currents.

SECONDARY DISTRIBUTION

The secondary distribution within the proposed Rutherford II Library will be at 600Y/347 volt and 208Y/120 volts. The 600Y/347 volt system will be provided for the connection and operation of motors, over 1/2 horse power, fluorescent and high intensity discharge lighting. 600 volts will be the utilization voltage for the former and 347 volts the utilization voltage for the two latter. The 208Y/120 volt system will be provided for the connection and operation of motors, 1/2 horse power and under, receptacles and incandescent lighting. The distribution systems will have their own distinctive color code for feeder and branch circuit conductors. The 600Y/347 volt system shall be coded as follows: Phase A - Orange; Phase B - Brown: Phase C - Yellow. The 208Y/120 volt system shall be coded as follows: Phase A - Red: Phase B - Black: Phase C - Blue. The secondary distribution systems will rise vertically from the main electrical room, located in the basement to each of the smaller electrical rooms, located one on each level of the proposed Rutherford II Library. The horizontal distribution will eminate from these smaller rooms to service the needs of that particular level. The secondary distribution systems will be designed to provide for the disciplines of each area as well as for 25% spare capacity in feeders, panel-boards etc., for any future additions or modifications that may be required.

ELECTRICAL
DESIGN DEVELOPMENT

LIGHTING

The lighting design for Rutherford II Library will be based upon the use of two basic sources of light, namely fluorescent and incandescent. The illumination will be of good quality and of adequate quantity , taking into consideration the area to be illuminated and the task to be performed. The lighting levels for the building will be based upon the recommendations as previously described in the Phase I Schematic Design Report.

The basement levels will be equipped with fluorescent lighting - basically of the open strip type.

The grade level will have various sources of light. The galleria will be equipped with fluorescent and incandescent sources. The stack and reader areas will be mostly fluorescent. The stack lighting will be of the enclosed type running the full length of the stack and centered between same. The reader areas will have square recessed fixtures, direct type, with provisions for integrating the mechanical return and supply grilles.

The second level will have fluorescent lighting as its main source. The catalogue and reference departments will have a totally integrated luminous ceiling. The work areas will have recessed, mechanically integrated direct fluorescent units. The lighting over the walkway will be fluorescent, recessed into the structural coffer.

The third, fourth, and fifth levels will be equipped with fluorescent as the primary light source. The stack and reader areas will be treated as described above for the stack and reader lighting in the

LIGHTING (Continued)

grade level.

In general, the quality and quantity of light for a specific area (space) will be such so that the area (space) may be utilized to achieve maximum efficiency.

EMERGENCY

An emergency power source will be provided, the source of power will be from a forced air cooled natural gas engine generator set. The generating unit will provide power at the 600Y/347 volt level, which will in turn be transformed to meet the requirements of the 208Y/120 volt system. A separate emergency distribution system will be provided for:

1. Lighting the means of egress and exits from technical service, stack, reader and circulation areas. This shall be in accordance with the requirements of the National Building Code, 1966 Edition Amended.
2. Lighting of the mechanical and electrical rooms.
3. Fire alarm system.
4. Security alarm system.
5. Mechanical motors and equipment as directed by the mechanical consultant.

FIRE ALARM

The fire alarm system to be provided will be a non coded supervised

FIRE ALARM (Continued)

system complete with control panel, manual stations, alarm bells, heat detectors, products of combustion detectors, annunciator panels, return and supply fan shut down provisions all in accordance with the requirements of the National Building Code, 1966 Edition Amended. This system, by means of a relay, will be tied into the central fire alarm system of the University. The main control panel will be located in the basement electrical room.

CLOCK AND PROGRAM

The clock and program system will be installed in the various areas as may be directed and/or required. The clock and program system will be controlled from the central system of the University. Booster relays will be provided as required for the extension of the clock and program system. The relays will be located in the basement electrical room and the signal cable from the central clock and programmer will enter this room via the cable tray located in the services tunnel Phase IIB.

COMMUNICATIONS

1. TELEPHONE

   The telephone system shall be tied into the existing University central exchange. The telephone service to the building will enter from access M1-30 services tunnel Phase IIB, via cable tray, to the main terminal backboard location in the basement electrical room. The telephone system will be distributed vertically through the building with terminal backboards located in the electrical room on each level. Telephone outlets will be located as required and/or as directed.

COMMUNICATIONS (Continued)

2. INTERCOMMUNICATION

An intercommunication system should be provided between the various departments. The intercommunication system will help to alleviate the heavy demands that are being made on the telephone exchange as far as external communication is concerned. The system should be flexible, be of the dial or pushbutton type and have provisions for accepting the requirements of Stages 2 and 3 in the future. If it is not possible to provide the intercommunication system in Stage 1, then the conduit system will be installed with provisions for installation in the future. This item is subject to review and change.

3. PAGING

A general paging system, of the radio frequency type, was recommended in the Design Phase 1 report. The conditions set forth in that report have not changed and provisions for the installation of the loop antenna only will be made in Stage 1. The paging system in general is subject to review and subsequent change.

4. TELEVISION AND INFORMATION RETRIEVAL

In the Phase 1 Design Report, it was proposed that a vertical and horizontal raceway system be provided for the television and information retrieval systems. To date, further information on these systems have not been obtained. Therefore, the specific

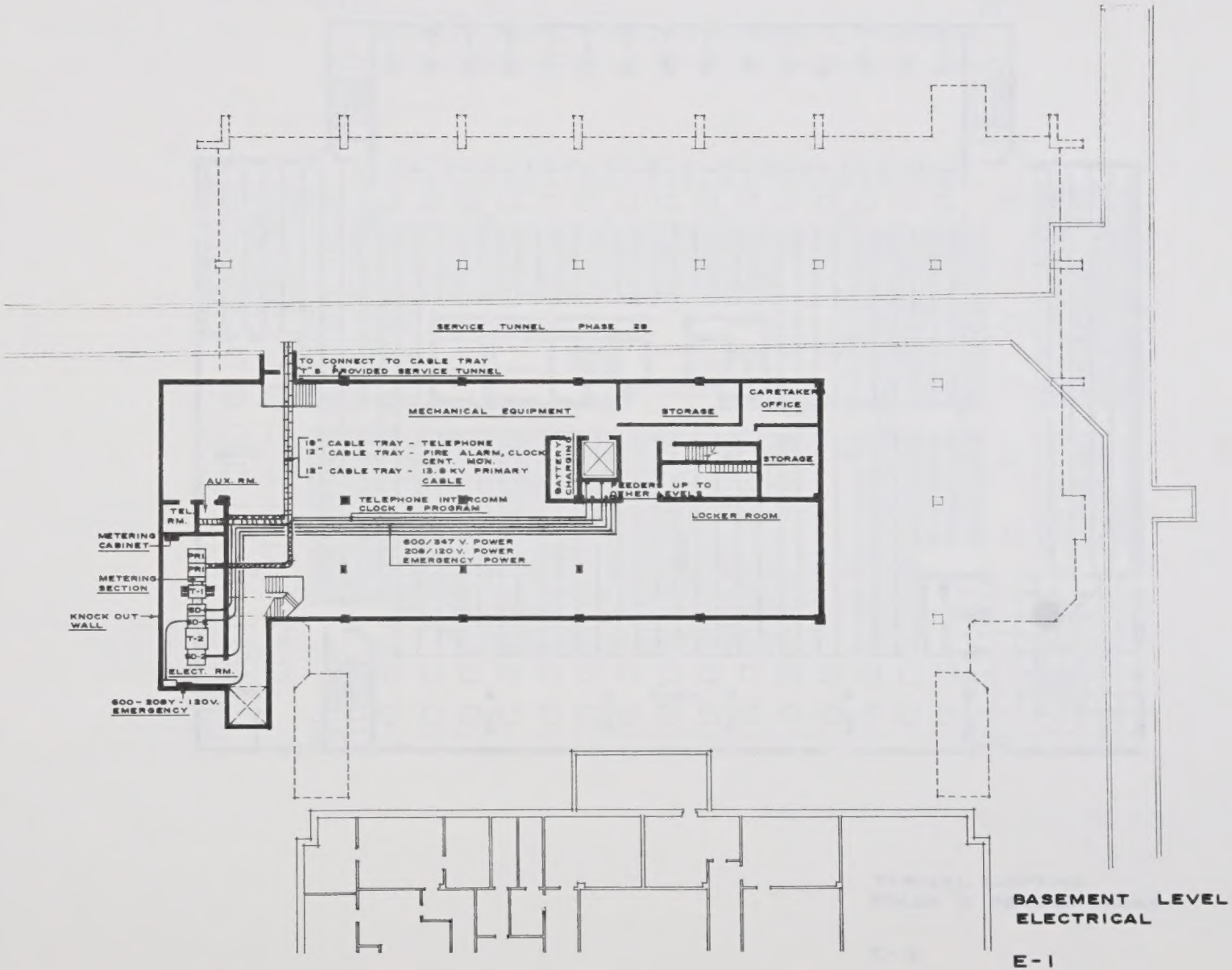
COMMUNICATIONS

4. TELEVISION AND INFORMATION RETRIEVAL (Continued)

requirements for these systems will have to be obtained. Therefore, the specific requirements for these systems will have to be obtained from the Campus Development Office and the Faculty, before any provisions for these raceways can be made.

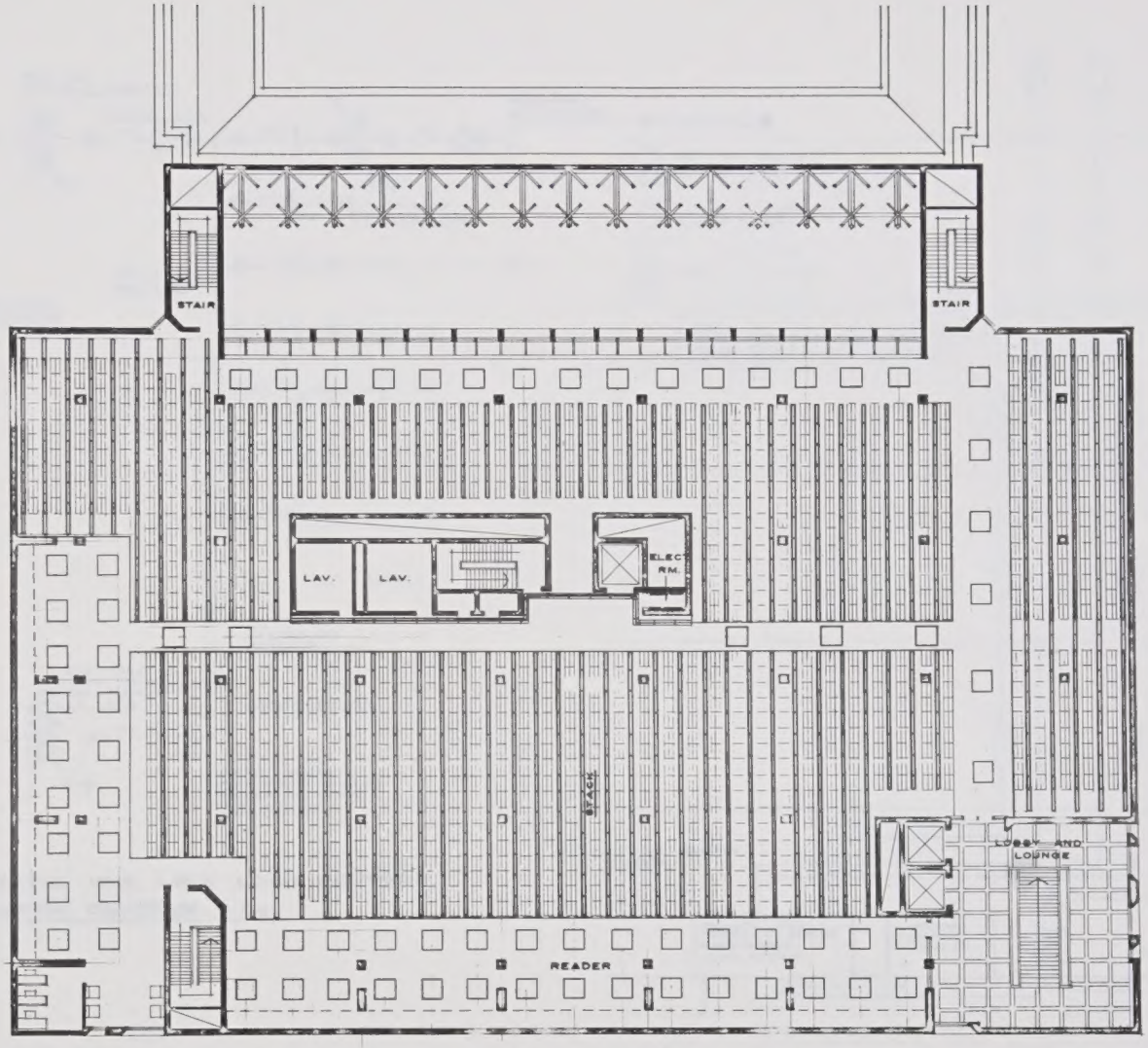
SECURITY

A security system is proposed to indicate the use of uncontrolled exit doors from the stack and reader areas. The system shall be as follows: Each of the exit doors will be equipped with a concealed jamb switch; and annunciator panel and alarm bell will be located at the main check out desk. When a door is opened, the alarm bell will be activated and the door location will be indicated on the annunciator.



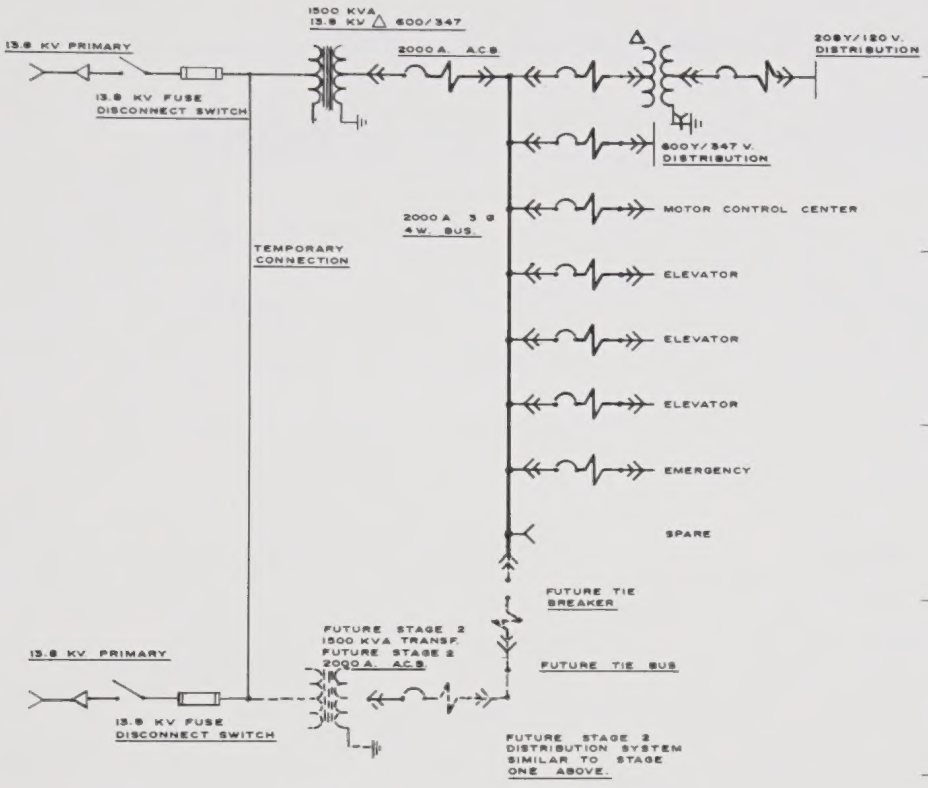
BASEMENT LEVEL
ELECTRICAL

E-1

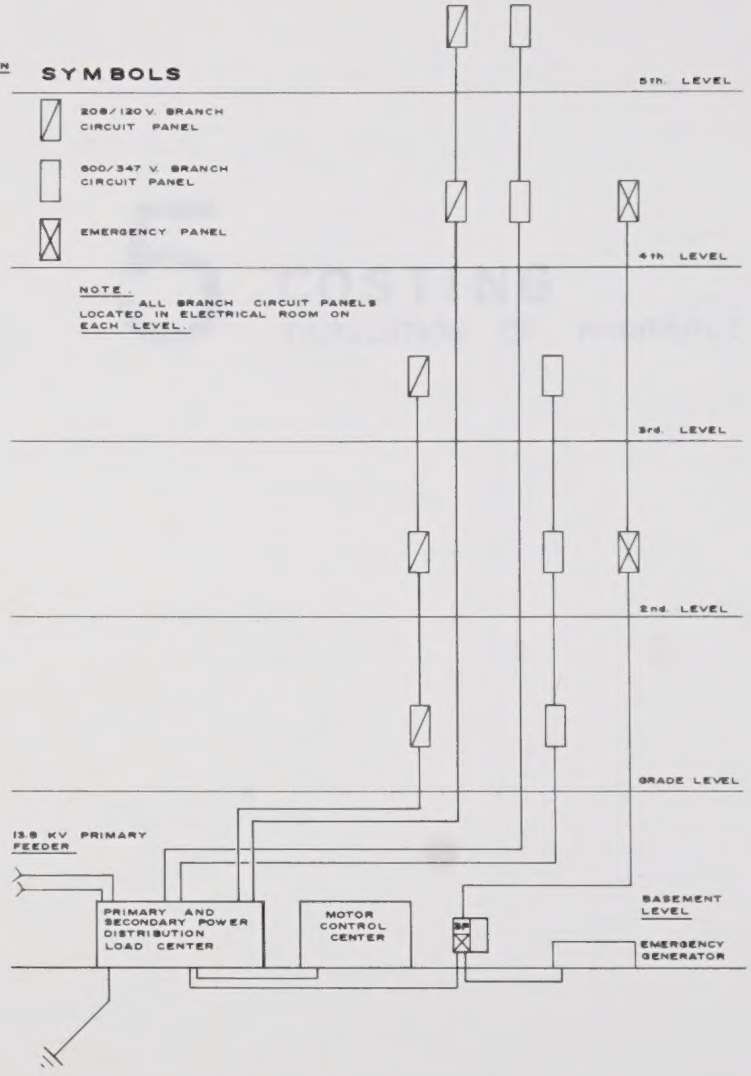


TYPICAL LIGHTING
STACK & READER AREAS

E-2



PROPOSED SCHEMATIC ONE LINE LOAD CENTER
DISTRIBUTION DIAGRAM n.t.s.



SCHEMATIC ONE LINE POWER RISER DIAGRAM

ELECTRICAL ONE LINE &
RISER DIAGRAM

E-3

5 COSTING

TABULATION OF PROBABLE COST

COSTING

TABULATION OF DESIGNED AREAS

The resulting floor areas in square feet:

FLOOR LEVEL	NET PROGRAM AREA	NET AREA PROVIDED	GROSS AREA	NET TO GROSS
Basement	--	--	8,980	--
Grade	14,640	14,430	23,160*	.62
Second	13,970	13,660	20,605	.66
Third	22,250	22,240	25,285	.88
Fourth	24,580	24,890	29,760	.84
Fifth	24,580	24,890	29,760	.84
TOTAL:	100,020	100,110	137,550	.64

* Includes a mean galleria area of 5,695 square feet.

The budget for the General Contract amounts to $3,245,000.00. (Project Cost Summary estimate dated February 10, 1970.)

The resulting allowable unit cost, based on the total gross area of 137,550 square feet, amounts to $23.60 per square foot.

COSTING

FURTHER STATEMENT OF PROBABLE COST

Gross square footage: 137,550 square feet.

COST ESTIMATE

Architectural:	$1,425,000.00*
Structural:	732,000.00*
Mechanical:	700,000.00
Electrical:	388,000.00
	$3,245,000.00

* Revised from Schematic Design Phase 1 Report.

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